

# P a t e n t   C l a i m s :

1. A method of estimating the pitch of a speech signal

5    (2), said method comprising the steps of:

- dividing the speech signal into segments,
- calculating for each segment a conformity function for the signal, and
- detecting peaks in the conformity function,

10   c h a r a c t e r i z e d    in that the method further comprises the steps of:

- calculating an average value of pitch estimates estimated in a number of previous segments,
- calculating for each peak in the conformity function the difference between the position of the peak and
- 15        said average value, and
- using the position of the peak having the smallest value of said difference as an estimate of the pitch.

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2. A method according to claim 1,   c h a r a c t e r -  
i z e d   in that it further comprises the steps of:

- sampling the speech signal to obtain a series of samples, and
- 25    • performing said division into segments such that each segment has a fixed number of consecutive samples.

3. A method according to claim 1 or 2,   c h a r a c -  
30   t e r i z e d    in that it further comprises the steps of:

- estimating a set of filter parameters using linear predictive analysis (LPA),
- providing a modified signal (26) by filtering the
- 35        speech signal through a filter based on said estimated set of filter parameters, and

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- calculating said conformity function of the modified signal.

4. A method according to any one of claims 1 to 3,  
 5 characterized in that said conformity function is calculated as an autocorrelation function.

5. A method according to any one of claims 1 to 4,  
 10 characterized in that it further comprises the step of:

- selecting, if the peak having the smallest value of said difference is represented by a number of samples, the sample having the maximum amplitude of said conformity function as said estimate of the  
 15 pitch.

6. Use of the method according to any one of claims 1 to 5 in a mobile telephone.

20 7. A device adapted to estimate the pitch of a speech signal, and comprising:

- means (3) for dividing the speech signal into segments,
- means (5) for calculating for each segment a conformity function for the signal, and  
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- means (6) for detecting peaks in the conformity function,

characterized in that the device is further adapted to:

- 30 • calculate an average value of pitch estimates estimated in a number of previous segments,
- calculate for each peak in the conformity function the difference between the position of the peak and said average value, and

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- use the position of the peak having the smallest value of said difference as an estimate of the pitch.

5 8. A device according to claim 7, c h a r a c t e r -  
i z e d in that it further comprises:

- means (3) for sampling the speech signal to obtain a series of samples, and
- means for performing said division into segments  
10 such that each segment has a fixed number of consecutive samples.

9. A device according to claim 7 or 8, c h a r a c -  
t e r i z e d in that it further comprises:

- 15 • means (4; 24) for estimating a set of filter parameters using linear predictive analysis (LPA),
- means (4; 25) for providing a modified signal by filtering the speech signal through a filter based on said estimated set of filter parameters, and
- 20 • means (5) for calculating said conformity function of the modified signal.

10. A device according to any one of claims 7 to 9,  
c h a r a c t e r i z e d in that said conformity func-  
25 tion is an autocorrelation function.

11. A device according to any one of claims 7 to 10,  
c h a r a c t e r i z e d in that it is further adapted to  
30 select, if the peak having the smallest value of said difference is represented by a number of samples, the sample having the maximum amplitude of said conformity function as said estimate of the pitch.

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12. A device according to any one of claims 7 to 11, characterized in that the device is a mobile telephone.
- 5 13. A device according to any one of claims 7 to 11, characterized in that the device is an integrated circuit.

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